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09/816,601	03/23/2001	Masaki Ueno	73600.P029	6171

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EXAMINER

FALASCO, LOUIS V

ART UNIT	PAPER NUMBER
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1773

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DATE MAILED: 12/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/816,601

Applicant(s)

UENO ET AL.

Examiner

Louis Falasco

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 - 20 is/are pending in the application.
- 4a) Of the above claim(s) 10 and 13 - 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 - 9 and 11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1 to 20 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

Papers Received

The Information Disclosure Statement, received April 04, 2002 is acknowledged.

Claims

The Claims are 1 -20

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

Group I. Claims 1 - 9 and 11, drawn to magnetoresistive sensor apparatus for sensing magnetic flux, classified in class 428, subclass 692.

Group II. Claim 12 - 16, drawn to a method of coating, classified in class 427, subclass 58.

Group III. Claim 17, drawn to magnetic storage device, classified in class 428, subclass 694R.

Group IV. Claims 18, drawn to an electrical circuit, classified in class 361, subclass 139.

Group V. Claims 19 and 20, drawn to coating means, classified in class 118, subclass 715.

Group VI. Claim 10, drawn to a magnetic head, classified in class 428, subclass 494R.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions of Group II and Group V are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed could be practiced by another materially different apparatus, such as laminating apparatus where preformed layers are applied.

3. Inventions of Group V and Groups I, III, IV & VI are related as apparatus and products made. The inventions in this relationship are distinct if either or both of the following can be shown: (1) that the apparatus as claimed is not an obvious apparatus for making the product and the apparatus can be used for making a different product or (2) that the product as claimed can be made by another and materially different apparatus (MPEP § 806.05(g)). In this case that the apparatus as claimed is not an obvious apparatus for making the product since other apparatus, such as lamination or layering apparatus, can be used with means to apply preformed layers to form the products of Groups I, III, IV, and VI.

4. Inventions Group II and Groups I, III, IV, VI are related as process of making and products made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as

claimed can be made by another and materially different process such as the application of preformed layers rather the use of a coating process of Group II.

5. Inventions of Group I and Groups III, IV and VI are related as mutually exclusive species in an intermediate-final product relationship. Distinctness is proven for claims in this relationship if the Group I intermediate product is useful to make other than the final Groups III, IV and VI products (MPEP § 806.04(b), 3rd paragraph), and the species are patentably distinct (MPEP § 806.04(h)). In the instant case, the intermediate product is deemed to be useful as a badge device indicator for detection of magnetic fields and the inventions are deemed patentably distinct since there is nothing on this record to show the inventions of Groups III, IV and VI to be obvious variants. Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions anticipated by the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

6. During a telephone conversation with Bradley J. Bereznak, esq. on December 2, 2002 a provisional election was made *without* traverse to prosecute the invention of Group I, claims 1 - 9 and 11. Affirmation of this election must be made by applicant in replying to this Office action.

7. Claims 10 and 12 - 20 stand withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Conclusion to Restriction Requirement

Restriction has been required.

- Claims 1 – 9 and 11 have been elected.
- Claims 10 and 12 - 20, have been withdrawn from further consideration

Claims under consideration are those of Group I - claims 1 through 9 and 11.

DETAILED OFFICE ACTION ON ELECTED INVENTION

Rejections under 35 USC 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1 to 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Gurney et al** US 5422571 (copy provided by applicants) taken with the teachings of either **Fukuzawa et al** US 6338899 (note filing date) or **Gill** US 6219208 (note filing date).

**Gurney et al** teaches a structure for a magnetoresistive spin valve like that of the instant claims except for the electron reflective layers.

**Gurney et al** discloses a magnetoresistive spin valve having a free ferromagnetic layer adjacent a pinned ferromagnetic layer, and a back layer of non-magnetic material (see layer 75 construction, and col. 2 lines 35- 63, col. 4, lines 43 - 59 describing Fig. 2).

In **Gurney et al** a spacer is between magnetic layers (see layer 71 in Fig. 6; or layer 89 in Fig. 7; or see spacer layer 99 in Figure 8 between pinned ferromagnetic layer 101 and free ferromagnetic layer 97). This spacer, detailed in instant claim 2, intrinsically influences pinning in adjacent layers through its separation function drawing apart the magnetic layers<sup>1</sup>. A non-magnetic backing (layer 75 in Fig. 6 or layer 93 in Fig. 7) is included in the magnetoresistive spin valve of **Gurney et al**; an exchange bias layer composed of anti-ferromagnetic material (see material composing layer 67 of Figures) and non-magnetic backing layers of any of the Figures (e.g., at layer 63 of Fig. 6).

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<sup>1</sup> Also as to claim 2 reciting an anti-ferromagnetic layer affecting the direction of pinning magnetization: layer 67 insures that the element structure would create the desired coupling between pinned & free ferromagnetic fields, so evidently has an influence. This is also described in the subsequently cited **Fukuzawa et al** and **Gill** references where it is employed in exchange coupling - **Gill** and **Fukuzawa et al** point to its affect on the pinning see **Gill** col. 8 lines 38 and 39 and see **Fukuzawa et al** col. 7 lines 27 - 29.

Either one of **Fukuzawa et al** or **Gill** teach electron reflective layers. See **Fukuzawa et al** col. 60 lines 22 – 30, layers shown in figure 36; or see **Gill** col. 1 lines 10 – 14, col. 3 lines 23 – 45 cf. layers 222, 228, 226.

In **Fukuzawa et al**, note Figures 27 – 34 and 52, where **Fukuzawa et al** teaches the electron reflective layer connected with pinned and free ferromagnetic layer pairs - such as shown in Figure 52 - in magnetoresistive structures, like **Gurney et al**, also having an anti-ferromagnetic layer. Further, considering the anti-ferromagnetic layer limitation of instant dependent claim 2, **Fukuzawa et al** teaches having anti-ferromagnetic layer - cf. the “comparative cases” in **Fukuzawa et al** and col. 29. of **Fukuzawa et al**. **Fukuzawa et al** also teaches the advantage of selecting oxides for the reflective layer- as in the instant dependent claims 3, 4, 5, 6 and 9 - see col. 64 lines 50 to 64 of **Fukuzawa et al**, and note the graphical representations emphasizing advantages of selecting the oxides over other materials, in Figure 36 see also col. 72 lines 21 – 26 of **Fukuzawa et al**. **Fukuzawa et al** also teaches having backing layer within the range of instant dependent claims 7 and 8 - see for instance columns 85 & 86, falling within the range of these claims, though thickness selections would have been an obvious matters of routine optimization in any case, merely dependant on the degree & effect desired and specific combinations of materials needed for supporting the structure, all considered obvious with in the scope of known in the prior art materials.



In **Gill** note any of Figures 9 through 17 where a reflective layer is in a spin valve with pinned and free ferromagnetic pairs, and the spin valve has spacer layers composed of ruthenium or copper - corresponding to materials of instant claim 2. **Gill** also teaches metal oxides - as in the instant dependent claims 3, 4, 5, 6 and 9 - for a reflective layer (see for example the *NiO* composition of the layer corresponding to the 'SR2' of the Figures in **Gill**) the specific selection of which would have been within the skill of the ordinary worker in view of the recitation of the oxide in lieu of elemental metal suggested by **Gill**.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to adapt the teachings of including electron reflective layers of either one of **Fukuzawa et al** or **Gill** in the **Gurney et al** magnetoresistive spin valve structure for the purpose of attaining a high performance, large capacity structure in a magnetoresistive spin valve. One skilled in the art would have been motivated to adapt the teachings of either one of **Fukuzawa et al** or **Gill** to **Gurney et al** with an expectation of successfully increasing the sensitivity, stability of the ferromagnetic layers and output recording density - see also **Fukuzawa et al** col. 1 & 2 or see **Gill** col. 3.

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Reference cited by examiner in this action but not applied

Gill (US 6181534) is cited of interest further illustrating pinned magnetic layers in spin valves with reflective layers.

Conclusions

Applicants Information Disclosure Statement has been received.

- English language references have been considered.

Restriction has been required.

- Claims 1 – 9 and 11 have been elected and claims 10 and 12 - 20, have been withdrawn from further consideration

Claims 1 – 9 and 11 have been examined.

- All claims examined have been rejected as being unpatentable
- No claim has been allowed in this action.

Contacts:

- Any inquiry concerning this communication from the examiner should be directed to examiner Louis Falasco, Ph.D. whose telephone number is 703.305-6974. The examiner can normally be reached M-F 9:30 AM – 6:00 PM.
- If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Paul Thibodeau may be reached at 703.308-2367.

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- The Fax phone numbers for the organization where this application or proceeding is assigned are: 703.872-9310 for regular communications and 703.872-9311 for after 'Final' communications.
- An inquiry of a general nature or relating to status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308-0651.

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December 5, 2002



**STEVAN A. RESAN**  
**PRIMARY EXAMINER**